



# The U.S. must invest in research and innovation to broaden economic opportunity

By Farnam Jahanian

**T**he nation is experiencing a watershed moment for science and innovation. Both houses of Congress recently held hearings to discuss bold new plans to accelerate the nation's science and innovation ecosystem to address major societal challenges and, in the process, reignite the U.S. economy. I had the privilege to serve as a witness in one of these hearings last Thursday.

These discussions come at a

true inflection point for U.S. competitiveness. While investments in research and development (R&D) have fueled our nation's broad prosperity since World War II, our R&D ecosystem is now at a critical moment, shaped by three major trends I highlighted in my testimony.

First, major leaps in data-enabled, technology-driven research are reshaping businesses and markets and changing the nature of discovery itself. According to analysis by Gartner, Inc., 75 percent of enterprises will shift from

piloting to operationalizing artificial intelligence (AI) by the end of 2024.

The second trend is the rise of global competition. The U.S. R&D engine had been the envy of the world for the last half century, but our global competitors are now replicating our models to support their own discovery and innovation-based economies. The United States' R&D investment as a percent of GDP, a measure of a nation's R&D intensity, has remained stagnant for more than half a century and now

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ranks ninth in the world according to a March 2021 Organisation for Economic Co-operation and Development publication.

The third trend is a widening opportunity gap and rising economic inequality. Digital transformation, new technologies and globalization have contributed to a profound reshaping of our workforce. Yet, persistent structural barriers to access and opportunity are preventing the benefits of our innovation-based economy from being shared by all Americans. A 2019 study by the Brookings Institution found that 90 percent of technology-related job growth has taken place in just five coastal metro regions.

Enabling broad-based participation in a science-led innovation economy requires bold, new strategies.

Fortunately, bipartisan leadership has emerged to seize this moment, and there are robust proposals from both houses of Congress and the Biden administration.

As we consider how to respond to this pivotal moment, doubling federal investment in research over the next several years is an urgent need. Some believe we need to choose between curiosity-driven or use-inspired research for increased support. This is a false choice. Scientific innovation occurs along a dynamic continuum — from foundational discovery to applied research. From the internet to the rapid development of mRNA vaccines, some of our most important breakthroughs have stemmed from support for innovation across this dynamic continuum.

In addition to committing to foundational research across all disciplines, we must be intentional in investing in use-inspired research that is motivated by societal priorities like healthcare, sustainability, cybersecurity, education and more. To catalyze mission-driven approaches for these complex challenges, the

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nation needs targeted investments in key emerging technologies, including AI, autonomy and robotics, advanced materials and manufacturing, biotechnology, quantum computing and next-generation wireless.

The nation must also build a broad-based science and technology workforce that is inclusive of all Americans. We need to ensure every child and young adult has access to training in digital competency and computational thinking, to double the number of graduate students and post-doctoral researchers in science and engineering and to inspire Americans to meet our national science needs through a national scholarship for service initiative, connecting talent with high-demand areas.

Finally, the United States needs new,

bolder strategies for transitioning discoveries from lab to market, with a relentless focus on expanding the geography of innovation. Our universities and national labs, which have extraordinary capacity to generate discoveries and innovations that catalyze economic growth and job creation, can anchor these efforts. With novel public-private partnerships, the nation must invest in entities “adjacent” to universities capable of facilitating seamless fusion and transfer of ideas, technologies and skills. The possibilities for creative, innovation-based economic development partnerships to support American competitiveness are endless.

The National Science Foundation for the Future Act proposed in the House and the Endless Frontier Act, which was introduced yesterday in the Senate, would authorize increased funding and a new directorate within the National Science Foundation to lead these efforts, which I strongly support. Both bills aim to improve global competitiveness and advance innovation as a force for broad economic and societal prosperity.

As president of a major research university in Pittsburgh, a city that stands as an example of the transformational power of the innovation economy, I have witnessed firsthand the enormous impact of science and technology to generate economic opportunity and improve quality of life. In this time of critical global, economic and societal challenges, our nation must invest in American ingenuity and the talents of our students and workers. In doing so, we can both out-innovate our global competitors and enable the economic participation and prosperity of all Americans.

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Jahanian currently serves as the 10th president of Carnegie Mellon University. He previously served as assistant director at the National Science Foundation, heading the Computer and Information Science and Engineering directorate.